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A Model For Private-Sector Stormwater Management And Water Stewardship

Toronto's Partners in Project Green promotes collaborative and innovative strategies for low-impact development (LID) stormwater management, focusing on the industrial and commercial sector.

By Alyssa Cerbu and Eric Meliton

As the urbanization of watersheds continues, the challenge of redevelopment and retrofitting to adjust for population growth and upgrading aging infrastructure persists. With many of these projects facing unique challenges that include high capital costs, disengaged municipal stakeholders, and a lack of awareness of key watershed management issues, the potential to implement a retrofit or redevelopment project becomes difficult. With the growing concerns about flood management, increased financial and operational risks, and the need to create resilience to adapt to the impacts of climate change, there is a movement towards sustainable watershed management among forward-thinking industrial and commercial end users.

In Ontario, Canada, the Toronto and Region Conservation Authority (TRCA) focuses on the implementation of integrated watershed management initiatives in the most heavily urbanized city-region in Canada, leveraging the need for adaptation and innovation as the core aspects of each project. TRCA has regulatory jurisdiction over nine watersheds and a portion of the Lake Ontario shoreline in Ontario. TRCA is one of the largest of the 36 conservation authorities in Ontario and among the most urbanized. By working directly with public, private, and nonprofit partners, TRCA delivers watershed management programs that contribute to the preservation of healthy rivers and shorelines, greenspace, and biodiversity and strengthen the notion of sustainable communities and businesses.

A joint collaboration between TRCA and the Greater Toronto Airports Authority (Toronto Pearson International Airport) in 2008 created the public-private partnership group called Partners in Project Green (PPG, www.partnersinprojectgreen.com). PPG pursues collaborative, sustainable initiatives with more than 600 private companies and public organizations and is supported with program and service funding received from regional municipal partners. The group's focus on sustainable business solutions through the power of industry collaboration has led to the development of a competitive, high-performance, and eco-friendly business climate surrounding the airport. This focus area is called the Pearson Eco-Business Zone, which encompasses 14,000 hectares (35,000 acres), 12,500 businesses, and 350,000 employees within its community.

The Water Stewardship Performance Committee (WSPC) of PPG has a mandate to:

- Develop and implement water-specific programs, events, and consortiums;
- Provide leadership through collective water stewardship projects and initiatives; and

- Set program targets and metrics and drive tangible results in water footprint reduction.

In 2014, the WSPC began projects focused on the implementing innovative low-impact development (LID) stormwater management technologies and practices collaboratively with companies belonging to the Pearson Eco-Business Zone. The projects were undertaken with end users in the industrial, commercial, and institutional (ICI) sector, while utilizing a network of service and technology vendors who offered exclusive pricing on products and services provided, thus enhancing the value to these retrofit water stewardship projects.

Governed by a committee of private sector and municipal representatives, the WSPC is responsible for helping to promote, construct, and demonstrate the success of lot-level LID stormwater management systems, including green roof, permeable pavement, and rainwater harvesting technologies. Their ultimate goal is the replication and proliferation of lot-level LID stormwater management projects across the Pearson Eco-Business Zone to reduce the burden on aging municipal stormwater infrastructure.

Sustained Enthusiasm And Leadership

Calstone Inc. (www.calstoneinc.com), a steel furniture manufacturer based in Toronto, has undertaken numerous sustainable initiatives in its 20 years of business, including promoting its remanufacturing program to recycle and reuse products returned by customers to achieve zero percent to landfill sites; utilizing 100 percent clean, green electricity from regionally sourced, low-impact wind and hydro facilities; and setting long-term goals to be 100 percent disconnected from the grid and serve as a model green manufacturer.

In 2014, Calstone approached Partners in Project Green for assistance with a proposed rainwater harvesting installation, which would mark its second on-site water stewardship initiative. Their first involved a 2,000-gallon stainless steel tank that captures water from one of the facility's six downspouts and uses it for cooling spot-welding equipment and flushing toilets. The second project would include disconnecting the remaining downspouts, while designing a way to utilize the rainwater for on-site irrigation, infiltrate the stormwater into the local Highland Creek watershed, and reduce the burden to the aged sewer infrastructure of Toronto.

The enthusiasm to pursue such a project is rare among small to medium enterprises in the ICI sector, which led to a full-scale

facilitation from the WSPC to work with an innovative visionary determined to implement an on-site water stewardship project.

With financial assistance, grants, and in-kind vendor contributions facilitated by the WSPC, the on-site rainwater harvesting and infiltration project reached a value of more than \$100,000, whereas the original concept design proposed by Calstone Inc. was estimated at \$5,000. These financial grants and incentives combined with the in-kind and discounted vendor contributions attributed to the reduction of potential capital costs associated with these types of projects, provide a collaborative model that can be replicated for other ICI sector participants seeking similar ways to improve overall sustainability.

Collaborative Endeavor

The final project completed by Calstone Inc. and the WSPC included the following:

- 42,000-square-foot rooftop retrofit
- Conversion of unusable land into an employee green space
- 8,400-square-foot infiltration and retention system (including two retention ponds, one infiltration pond, and one infiltration trench)
- Installation of a 9,300-liter (~2,450-gallon) rainwater harvesting tank to be used for on-site irrigation.

Calstone’s on-site stormwater management system involves collecting rainwater from four of its six downspouts that were disconnected from the roof and feeding it to the municipal storm sewer. Once a storm event occurs, the water flows from the downspouts into the 9,300-liter rainwater harvesting tank or the infiltration trench. One of the tanks overflows into the three interconnected ponds, two of which provide temporary water retention and infiltration, while one is a permanent, striking water feature. These ponds are adjacent to a recycled materials walkway, which allows visitors and employees to walk alongside the new features and leads to the secondary infiltration trench at the back end of the building.

The official planting of drought-resistant native plants and



before



after

shrubs was completed in spring 2015. Additionally, monitoring of the performance of these stormwater treatment and infiltration technologies will commence in 2015 and continue for two years. The findings gained from evaluating the effectiveness and cost viability of such systems can be used to encourage the installation of future ICI property retrofits elsewhere.

In total, it is estimated that the stormwater management system will be able to capture, infiltrate, and divert approximately 1.9 million liters (more than 500,000 gallons) of water annually. This will help restore a more natural water cycle to nearby Highland Creek. These stormwater best management practices also set Calstone Inc. apart from other medium-sized businesses in the area by providing an enhanced and distinguished green space for employees and showcasing dedication to exemplary water stewardship within their local watershed.

A Model For Sustainability And Corporate Water Stewardship

Calstone Inc.’s installation puts it ahead of the curve on addressing property-level LID solutions to stormwater management issues. Stormwater infrastructure in Toronto is aging and does not have the capacity to withstand the current population growth, increasing urbanization, and the threat of climate change, which is associated with occurrences of greater, more frequent storm events. This type of lot-level stormwater management demonstrates to the community at large a different and necessary approach to reducing the cost associated with retrofitting municipal infrastructure.

Additionally, at a property level, this type of infrastructure mitigates the risk of incurring property damage during large storm events, which Toronto has seen in the previous years (e.g., Insurance Bureau of Canada estimated the July 8, 2013 storm cost approximately \$1 billion in damages) and is likely to occur more often in the future.

Calstone’s project is a model for other ICI companies throughout North America and beyond to follow, as the collaborative project with PPG focused on the impact to the triple bottom line — social, environmental, and financial. Emphasis was placed on the social and environmental aspects of the project, with a financial impact experienced through incentives, in-kind vendor contributions, and a reduction in localized flood risk. When combined, these factors mitigate the overall risk of high capital expenditures expected for these types of projects, while addressing key issues associated with effective watershed management. By continuing to develop service and technology vendor networks willing to collaboratively pursue implementation projects with engaged government stakeholders, the notion of long-term replication of these types of projects may become a reality. ■

About The Authors



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